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Terms	Documents
L1 and ((metal adj oxide) near2 (precursors))	1

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result set*DB=USPT; PLUR=YES; OP=ADJ*

<u>L2</u>	L1 and ((metal adj oxide) near2 (precursors))	1	<u>L2</u>
<u>L1</u>	FET and monolayer and nanoparticles	15	<u>L1</u>

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L2: Entry 1 of 1

File: USPT

Aug 27, 2002

DOCUMENT-IDENTIFIER: US 6440213 B1

TITLE: Process for making surfactant capped nanocrystals

Brief Summary Text (3):

The advent of new methods to prepare semiconductor and metal nanocrystals, specifically the injection of molecular precursors into hot organic surfactants, has yielded markedly improved samples with good size control, narrow size distributions, and good crystallinity of individual and dispersable nanocrystals.^{..sub.1-3} It is of considerable interest to apply these methods to the synthesis of transition metal oxide nanoparticles, which typically are prepared by methods involving water as solvent or reactant.^{..sub.4-9} Using nonhydrolytic preparations of metal oxide nanocrystals at high temperature in organic surfactants, one observes markedly different properties with respect to defect structure and surface composition. So far, there has been only one example of the solution-based nonhydrolytic synthesis of individual TiO₂ nanocrystals.^{..sub.10} Metal oxide nanocrystals with nonhydroxylated surfaces are believed to have significant advantages for applications in catalysis, ceramics, energy storage, magnetic data storage, sensors, ferrofluids, etc.

Drawing Description Text (3):

FIG. 2, shows a Low-resolution TEM image of a monolayer of individual γ -Fe₂O₃ nanocrystals (10.0 \pm 1.5 nm) covering an area bigger than 2 μ ². Top left: High-resolution TEM image of one of the nanocrystals in this sample. The indicated lattice plane distances correspond to the (113) and (201) lattice planes of tetragonal γ -Fe₂O₃ with ordered superlattice of the cation vacancies. Top right: FET of the high-resolution TEM image looking down the [512] zone-axis.

Detailed Description Text (4):

Dried powders of metal cupferronates show sharp decomposition temperatures of 180, 230, and 205 C. for FeCup₃, MnCup₂ and CuCup₂, respectively, when heated in a DTA/TGA apparatus under nitrogen. XRD of the respective decomposition products reveals that they consist of γ -Fe₂O₃, MnO, and Cu. The latter is a consequence of the reduction of CuO/Cu₂O by the reducing atmosphere given by the organic decomposition products of the Cupferron complex. This result proves that metal Cupferron complexes can indeed act as molecular precursors for transition metal oxides in the absence of O₂ and H₂O.

Detailed Description Text (8):

Particles with average sizes down to 4 nm were synthesized by lowering the injection temperature and/or lowering the injected precursor concentration. For instance, injecting the FeCup₃ precursor solution at 250 C. and refluxing at 200 C. for 30 min, instead of 300 and 225 C. as in the sample of FIG. 1, yields γ -Fe₂O₃ nanocrystals 5.2 \pm 1.5 nm in size. However, the injection of an additional 2 mL of precursor solution after 5 min of refluxing at 200 C. results in particles with diameters of 6.1 \pm 1.8 nm. In all cases it was observed that subsequent extractions of the reaction precipitate with toluene yielded fractions containing continuously bigger particles. In the case of the preparation with an

additional secondary injection, each subsequent extraction of the reaction precipitate resulted in approximately a 1 nm increase in the average particle diameter. Consequently, the fifth fraction contained $\gamma\text{-Fe}_{2}\text{O}_{3}$ nanocrystals which were 10.0 ± 1.5 nm in diameter. A low-resolution TEM image of this fraction is shown in FIG. 2. Apparently, the slow evaporation of a dispersion of nanocrystals in toluene on a TEM grid leads to the formation of an extended monolayer of particles. The covered area is larger than $2\mu\text{m}^2$ and extends beyond the part shown in FIG. 2. Each particle is separated from neighboring particles by its shell of surfactant. Currently, the relatively broad size distribution of 15% prevents the formation of ordered superlattices as observed with other systems.^{3,21,22} However, we believe that by using size-selective precipitation,²³ in addition to size-selective extraction during the isolation process, we will be able to achieve size distributions with less than 10% standard deviation.

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Search:

L3

Refine Search

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L2 L1 and ((metal adj oxide) near2 (precursors))	1	L2
L1 FET and monolayer and nanoparticles	15	L1

END OF SEARCH HISTORY

TITLE: Polymer-inorganic particle composites

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KOMC	Drawn Ds
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5. Document ID: US 6537498 B1

L3: Entry 5 of 8

File: USPT

Mar 25, 2003

US-PAT-NO: 6537498

DOCUMENT-IDENTIFIER: US 6537498 B1

TITLE: Colloidal particles used in sensing arrays

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KOMC	Drawn Ds
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6. Document ID: US 6440213 B1

L3: Entry 6 of 8

File: USPT

Aug 27, 2002

US-PAT-NO: 6440213

DOCUMENT-IDENTIFIER: US 6440213 B1

TITLE: Process for making surfactant capped nanocrystals

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KOMC	Drawn Ds
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7. Document ID: US 6287765 B1

L3: Entry 7 of 8

File: USPT

Sep 11, 2001

US-PAT-NO: 6287765

DOCUMENT-IDENTIFIER: US 6287765 B1

TITLE: Methods for detecting and identifying single molecules

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KOMC	Drawn Ds
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8. Document ID: US 6159620 A

L3: Entry 8 of 8

File: USPT

Dec 12, 2000

US-PAT-NO: 6159620

DOCUMENT-IDENTIFIER: US 6159620 A

**** See image for Certificate of Correction ****

TITLE: Single-electron solid state electronic device

Full	Title	Citation	Front	Review	Classification	Date	Reference				Claims	KOMC	Drawn Ds
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Terms

Documents

L1 and precursors

8

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1. Document ID: US 6440213 B1

L2: Entry 1 of 1

File: USPT

Aug 27, 2002

US-PAT-NO: 6440213

DOCUMENT-IDENTIFIER: US 6440213 B1

TITLE: Process for making surfactant capped nanocrystals

Full	Title	Citation	Front	Review	Classification	Date	References	Claims	KUMC	Draw	De
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Terms	Documents
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